Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1) (currently amended) A method ~~intended~~ for active seismic monitoring of an underground formation ~~(1)~~ allowing ~~to separate~~ separation of induced microseismicity signals from seismic signals emitted within ~~the~~ a context of active seismic monitoring of an underground zone under development, comprising carrying out seismic recording cycles with emission of seismic waves in the formation by coupling therewith at least one ~~or more~~ seismic ~~sources (5)~~ source which, ~~in this case,~~ emits simultaneously orthogonal signals so as to form a composite vibrational signal, reception of the signals reflected by the formation in response to the emission of seismic waves, recording of the signals received by at least one seismic pickup ~~(2)~~ and processing of the signals recorded so as to separate the respective contributions of the seismic sources to the signals received and to reconstruct the seismograms equivalent to those that would be obtained by actuating the seismic sources separately, ~~characterized in that~~ wherein the induced microseismicity signals are separated in the records from the seismic signals resulting from active monitoring operations, by isolating ~~the~~ a contribution thereof by comparison with a reference spectral model by taking account of the spectral contributions of each source ~~(Si)~~ at the emitted fundamental frequencies emitted and at the respective harmonics thereof, and by reconstructing by inversion in the time domain the microseismicity signals.

2) (currently amended) A method as claimed in claim 1, ~~characterized in that the~~ wherein a spectral contribution of the microseismicity signals to the spectrum of the signals received is obtained by subtracting ~~the~~ amplitude and phase values associated with the reference spectral model from ~~the~~ amplitude and ~~the~~ phase of the spectrum associated with the records.

3) (currently amended) A method as claimed in claim 1 ~~or 2~~, ~~characterized in that~~ wherein the reference spectral model is a current spectral model formed by updating a previous spectral model by taking account of the spectral contribution of previous recording cycles.

4) (currently amended) A method as claimed in ~~any one of the previous claims~~claim 1, ~~characterized in that~~ wherein the current spectral model is formed by determining a mean value of the frequency spectra formed from earlier and/or later records obtained for ~~the~~ a same source and ~~the~~ same frequencies.

5) (currently amended) A method as claimed in ~~any one of the previous claims~~claim 1, ~~characterized in that~~ wherein the current spectral model is formed by determining a median value of the frequency spectra formed from earlier records obtained for the same source and the same frequencies.

6) (currently amended) A method as claimed in ~~any one of the previous claims~~claim 1, ~~characterized in that~~ wherein the current spectral model is formed by extrapolation or interpolation from the frequency spectrum from close spectral values.

7) (currently amended) A method ~~intended~~ for active seismic monitoring of an underground formation comprising discrimination of the induced

microseismicity signals from among signals emitted within ~~the~~ a context of active seismic monitoring of an underground zone under development, comprising carrying out seismic recording cycles with emission of seismic waves in the formation by coupling therewith ~~N~~ seismic sources ~~(Si)~~ emitting simultaneously and controlled by orthogonal signals so as to form a composite vibrational signal, reception of the signals reflected by the formation in response to the emission of seismic waves, recording of the signals received by seismic reception means and processing of the signals recorded so as to separate the respective contributions of the seismic sources to the signals received and to reconstruct ~~the~~ seismograms equivalent to ~~those~~ seisomograms that would be obtained by actuating the seismic sources separately, ~~characterized in that it comprises the following stages~~ comprising:

a) for each recording n of a recording cycle p, the respective contributions ($C_{p,l,n}$) of ~~the~~ various sources at the fundamental frequencies are calculated~~;~~

b) ~~the~~ a ratio ($E_{p,n}$) of ~~the~~ a contribution to a current spectral model ($M_{p,n}$) formed by updating a previous spectral model ($M_{p,n-1}$) from frequencies emitted during the previous recording (n-1) and from ~~their~~ harmonics thereof is then calculated~~;~~

c) ~~the~~ a part ($A_{p,n}$) of the recording n of cycle p that can be associated with the active seismic monitoring operations is deduced~~;~~

d) ~~the~~ a part ($P_{p,n}$) of the recording n of cycle p ~~strictly~~ relevant to the passive microseismic activity is deduced~~;~~

e) the seismograms that can be associated with ~~the~~ active seismic monitoring operations are formed by inversion in ~~the~~ a time domain of the

respective spectral contributions ($C_{p,l,n}$) of each seismic source (Si) at the fundamental frequencies and at ~~their~~ harmonics thereof, after completion of a measuring cycle~~,~~; and

f) ~~the~~ underlying microseismic signals contained in the records are formed by inversion in the time domain from ~~the~~ a part ($P_{p,n}$) relevant to the passive microseismic activity.

8) (currently amended) A method as claimed in claim 7, ~~characterized in that~~ wherein the spectral contribution ($C_{p,l,n}$) is obtained by multiplying a transfer function ($T_{p,l,n,r}$) between a wavelet characteristic of the source and a seismogram associated with a receiver r, by a wavelet characteristic of the source.

9) (currently amended) A method as claimed in claim 8, ~~characterized in that~~ wherein said transfer function is continuously updated.

10) (currently amended) A method as claimed in claim 9, ~~characterized in that~~ wherein updating of ~~said~~ the transfer function ($T_{p,l,n,r}$) is obtained during a current cycle from an estimation ($T_{p,l,n-1,r}$) made during a previous cycle and from an initial estimation ($To_{p,l,n,r}$) made during ~~the~~ a current cycle by the relation :

$$T_{p,l,n,r} = (1 - h)T_{p,l,n-1,r} + hTo_{p,l,n,r}.$$